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MEHTOD FOR FABRICATING LIQUID CRYSTAL DISPLAY DEVICE

15 [Abstract]

PROBLEM TO BE SOLVED: To solve the problem of defects due to seal break-off caused in the manufacturing process of a liquid crystal display device.

SOLUTION: In a production method for the liquid crystal display device,
20 there is provided a process which applies sealing material to any substrate among two substrates, while leaving an opening formation part and a process which puts the substrate into a pressurization chamber, where at least one side of upper and lower surfaces which can seal the periphery by
gluing together the substrate via sealing material is constituted of a sheet,
25 evacuating the inside of the chamber, hot-pressing the substrate through

the sheet by the difference from atmospheric air and adheres the substrate with the sealing material while separating a fixed interval to form a cell, a dummy pattern, consisting of the sealing material cut partially, is formed near the opening formation part.

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[Claims]

[Claim 1]

A method for fabricating an LCD device comprising: coating a sealant with an opening portion on one of two sheets of substrates; and
5 attaching the substrates, putting the substrates in a pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery, decompressing an interior of the chamber to heat and press the substrates through the sheet by a difference between the pressure of the interior of the chamber and atmospheric
10 pressure, and bonding the substrates with a certain interval therebetween by the sealant to thereby form a cell, wherein a dummy pattern formed of a sealant is formed near the opening portion, and a portion of the dummy pattern is not formed of the sealant so as to be opened at a position corresponding to the opening portion.

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[Claim 2]

A method for fabricating an LCD device comprising: coating a sealant with an opening portion on one of two sheets of substrates; attaching the substrates, putting the substrates in a pressing chamber
20 whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery, decompressing the interior of the chamber to heat and press the substrates through the sheet by a difference between the pressure of the interior of the chamber and atmospheric pressure, and bonding the substrates with a certain interval therebetween
25 by the sealant to thereby form a plurality of cells; and separately cutting the

plurality of cells and injecting liquid crystals into each cell, or injecting liquid crystals into the plurality of cells of the substrates and then cutting to separate the plurality of cells, wherein a dummy pattern formed of a sealant is formed near the opening portion, and a portion of the dummy pattern is not formed of the sealant so as to be opened at a position corresponding to the opening portion.

[Claim 3]

The method of claim 1 or 2, wherein when the sealant is coated with the opening portion on one of the two sheets of substrates, a dummy pattern is formed outside the cell, and then, the opening portion is cut out to be removed.

[Claim 4]

The method of claim 1 or 2, wherein when the sealant is coated with the opening portion on one of the two sheets of substrates, a distance between the opening portion and the dummy pattern is smaller than a width of the opening portion, and a width of the cut-out portion of the dummy pattern is larger than the width of the opening portion.

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[Title of the Invention]

MEHTOD FOR FABRICATING LIQUID CRYSTAL DISPLAY DEVICE

[Detailed description of the Invention]

5 **[Field of the Invention]**

The present invention relates to a method for fabricating a liquid crystal display (LCD) device.

[Description of the Prior art]

10 In a process of fabricating an LCD device, a dummy pattern formed of a sealant is required to restrain a cut-out material from being bounced out when a cell is cut. An example of a related art will now be described with reference to an accompanying drawing.

Figure 2 illustrates an example of a related art. As shown in Figure 2,
15 A reference numeral 21 denotes a first substrate, 22 denotes a second substrate, 23 denotes a sealant, 24 denotes an opening portion, and 25 denotes a dummy pattern.

In a process of fabricating an LCD device having a process of attaching, heating and pressing the first and second substrates 21 and 22,
20 and then, bonding the first and second substrates 21 and 22 spaced apart from the sealant 23 to thereby form a cell, the dummy pattern 25 is formed in a successive linear pattern with respect to the opening portion 24.

[Problems to be solved by the Invention]

25 In the related art, the substrates are put in a pressing chamber

whose at least one of upper and lower surfaces is formed as a sheet for hermetically closing the periphery, and the interior of the chamber is decompressed, so that the substrates can be heated and pressed through the sheet by the difference from the atmospheric pressure. In this case, however, with the thermally expanded air full in the cell, the seal dummy pattern positioned near the opening portion works as a cover for hampering air exhaust from the opening portion, which causes a problem that the sealant can be damaged and an yield is degraded. Especially, in the substrates with a plurality of cells, the distance between the opening portion and the dummy pattern is so close that the sealant can be easily damaged.

Therefore, an object of the present invention is to provide a method for fabricating an LCD device, in which, in order to prevent seal damage, a sealant dummy pattern positioned near an opening portion is partially cut out, so that, despite a short distance between the opening portion and the dummy pattern of a substrate with a plurality of cells disposed thereon, when substrates are put in a pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery from the opening portion, the interior of the chamber is decompressed, and the substrates are heated and pressed through the sheet by the difference from the atmospheric pressure, the thermally expanded air full in the cell can be leaked out through the gap formed at the sealant dummy pattern, thereby restraining damage of a sealant and improving an yield.

[Means for solving the problem]

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a method for fabricating an LCD device including: coating a sealant with an opening portion on one of two sheets of substrates; and
5 attaching the substrates, putting the substrates in a pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery, decompressing the interior of the chamber to heat and press the substrates through the sheet by the difference between the pressure of the interior of the chamber and the
10 atmospheric pressure, and bonding the substrates with a certain interval therebetween by the sealant to thereby form a cell, wherein a dummy pattern formed of a sealant is formed near the opening portion, and in this case, a portion of the dummy pattern is not formed of the sealant so as to be opened at a position corresponding to the opening portion.

15 With such a structure, in order to prevent seal damage possibly generated in the process of fabricating the LCD device, the seal dummy pattern positioned near the opening portion is partially cut out, so that when the substrates are put in the pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the
20 periphery and the interior of the chamber is decompressed to heat and press the substrates through the sheet by the difference from the atmospheric pressure, because the thermally expanded air full in the cell can be leaked out through the gap (namely, the cut-out portion of the dummy seal pattern), damage of the sealant can be restrained and the yield
25 can be enhanced.

[Embodiment of the invention]

The embodiment of the present invention will now be described with reference to the accompanying drawings.

5 Figure 1 shows an example of the embodiment of the present invention. In Figure 1, reference numeral 11 denotes a first substrate, 12 denotes a second substrate, 13 denotes a sealant, 14 denotes an opening portion, 15 denotes a dummy pattern, 16 denotes a width of the opening portion, 17 denotes a distance between the opening portion 14 and the
10 dummy pattern, and 18 denotes a portion of a line for cutting a plurality of cell therealong.

In the process of fabricating the LCD device including: attaching the first and second substrates 11 and 12 by the sealant 13, putting them in the pressing chamber whose at least one of upper and lower surfaces is formed
15 of a sheet for hermetically closing the periphery, decompressing the interior of the chamber to heat and press the substrates through the sheet by the difference from the atmospheric pressure; and bonding the first and second substrates 11 and 12 with a certain interval therebetween by the sealant 13 to form a cell, the dummy pattern 15 is a partially cut-out pattern
20 corresponding to the opening portion 14.

As for the partially cut-out portion, the distance 17 between the opening portion 14 and the dummy pattern 15 is smaller than the width 15 of the opening portion, and the width of the partially cut-out portion of the dummy pattern 15 is larger than the width 16 of the opening portion. The
25 dummy pattern 15 is cut out by the cut-out line 18 and then removed as a

marginal portion.

As mentioned above, in this embodiment, in the method for fabricating the LCD device including: coating the sealant with the opening portion on one of two sheets of substrates; and attaching the substrates, 5 putting the substrates in a pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery, decompressing the interior of the chamber, heating and pressing the substrates through the sheet according to a difference from the atmospheric pressure, and bonding the substrates with a certain interval 10 therebetween by the sealant to form a cell, wherein a dummy pattern formed of a sealant is formed near the opening portion, and in this case, a portion of the dummy pattern is not formed of the sealant so as to be opened at a position corresponding to the opening portion.

By having the dummy pattern made of a sealant and having a 15 partially cut-out portion, the shortcomings of seal damage possibly generated in the process of fabricating the LCD device can be resolved. Namely, when the substrates are put in the pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery and the interior of the chamber is decompressed to 20 heat and press the substrates through the sheet by the difference from the atmospheric pressure, the thermally expanded air full in the cell can be leaked out through the gap (namely, the cut-out portion of the dummy seal pattern corresponding to the opening portion), and accordingly, damage of the sealant can be restrained and the yield can be enhanced.

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[Effect of the invention]

As so far described, in order to solve the seal damage possibly generated in the process of fabricating the LCD device, the seal dummy pattern is partially cut out near the opening portion, the substrates are put in
5 the pressing chamber whose at least one of upper and lower surfaces is formed of a sheet for hermetically closing the periphery, and the interior of the chamber is decompressed to heat and press the substrates through the sheet by the difference from the atmospheric pressure. Therefore, the thermally expanded air full in the cell can be leaked out through the gap, and
10 thus, damage of the sealant can be restrained and the yield can be enhanced.

[Description of drawings]

Figure 1 illustrates an explanatory embodiment of the present invention.

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